“How Retroviruses Encapsidate their RNA Genomes”

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Professor Lever graduated in Biochemistry and Medicine from the University of Wales. Following clinical training there and in London and Newcastle, he did research training in immunodeficiency and infectious diseases in London and Harvard, where his work focussed on HIV infection. He was appointed Senior Lecturer at St. George’s Hospital, London in 1989 and moved to Cambridge in 1991. He was appointed Reader in Infectious Diseases in 1998 and appointed to a Personal Chair in 2000. He is an Honorary Consultant in Medicine and Infectious Diseases and was Head of the Infectious Diseases Unit at Addenbrooke’s Hospital from 1992-2009. He is clinically active in ID and chairs the Hospital Infection Control Committee. He runs a research group funded by Programme and Project grants from the Medical Research Council and The Wellcome Trust working on HIV and rotaviruses. He was a member of the UK Department of Health Gene Therapy Advisory committee from 1999-2006. He was awarded the Lennox Black International prize in Medicine from Thomas Jefferson University, Philadelphia in 2002. He was elected Fellow of the Academy of Medical Sciences in 2000 and Fellow of the Royal Society of Chemistry in 2006.

**Abstract**

HIV is a retrovirus responsible for the devastating worldwide AIDS pandemic. As a retrovirus it has genetic material made of RNA which is reverse transcribed by the virus, reverse transcriptase, into a DNA provirus which is integrated into the cellular genome. This DNA is transcribed by cellular polymerases to produce viral RNA, viral protein and, hence, viral particles. Selecting the viral RNA for encapsidation into the viral particle involves recognition of particular sequences and structures with the RNA when they are folded into a three-dimensional shape. The three-dimensional shape of this structure is now on the way to being solved and it is clear that the RNA undergoes critical structural changes during the encapsidation process. This is one of a number of different changes in shape of the viral RNA as it traffics through the cell, any one of which provides a novel therapeutic target. Encapsidation of the viral RNA occurs as a dimer and the association of the diploid RNA strands appears to be critical for virus replication. RNA dimerisation also appears to be important for normal particle assembly and morphogenesis. Understanding the viral RNA structure in this and other viruses can open up new therapeutic pathways for RNA binding drugs, of which many already exist.